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10/566,983	11/19/2007	Zamir Tribelsky	P-7784-US	2858

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EXAMINER	
COLEMAN, RYAN L	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/566,983	TRIBELSKY ET AL.	
	Examiner	Art Unit	
	RYAN COLEMAN	1714	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 July 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11,14,16-19,21-26 and 28-31* is/are pending in the application.

4a) Of the above claim(s) *30 and 31* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11, 14, 16-19, 21-26, 28, and 29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *02 February 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *12/7/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election of Group I, recited by claims 1-31, and Species A, recited by claims 14-16, 28, and 29, in the reply filed on July 12, 2010 is acknowledged. Because applicant did not distinctly and specifically point out any supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)). Claims 30 and 31 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1-8, 10, 11, 14, 16, 21-23, 28, and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application Publication No. 2001/0037819 by Mitsumori et al. (hereafter referred to as "Mitsumori").

6. With regard to claims 1 and 5, Mitsumori teaches a method of treating a surface (reads on *destination site*) of a substrate that involves coupling energy to a treatment liquid (Par. 0018, 0022, 0024, 0027, 0204, 0540, 0541; Figures 25A and 25B). In Mitsumori's method, light having predetermined output and wavelength (read on *predetermined parameters*) is projected from two light irradiating means (items 380 in Figure 25A; reads on *energy source*) such that the projected light is directed along a stream of liquid that contacts the surface of the treated substrate (Par. 0024, 0204, 0540, 0541). The stream of liquid flows through a crossing section (seen in cross-section as item 114 in Figure 25A), which is considered to read on applicant's pipe because as shown in Figures 25A and 25B, it is a hollow body for conducting a liquid.

Mitsumori teaches that the outside of the crossing section is surrounded by air (Par. 0152 and 0154; Figures 25A and 25B).

7. In the embodiment discussed, Mitsumori does not explicitly teach that the body of the crossing section contains quartz.

8. In a similar embodiment, Mitsumori teaches that such surfaces that are in contact with the treatment liquid preferably comprise quartz (Par. 0301).

9. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the discussed method of Mitsumori by having the hollow body forming the crossing section comprise quartz. The motivation for performing the modification was provided by Mitsumori, who taught that it is advantageous to have such liquid-contacting surfaces comprise quartz.

10. In the method of Mitsumori developed thus far, Mitsumori does not explicitly teach that the stream of liquid has a predetermined flow rate.

11. In a similar embodiment, Mitsumori teaches that it is advantageous to have the flow rate of such a liquid stream be predetermined because the flow rate of liquid through such a crossing section affects the pressure that the liquid exerts at the treated surface (Par. 0382).

12. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the developed method of Mitsumori by flowing the stream of liquid through the crossing section at a predetermined flow rate. The motivation for performing the modification was provided by Mitsumori, who taught that having such a

flow rate be predetermined is advantageous because the flow rate affects the pressure that the liquid exerts at the treated surface.

13. Further with regard to claim 1, in this developed method of Mitsumori, since light energy is projected onto the substrate surface and coupled to liquid, it is reasonably expected that the light energy will change a physical and/or chemical property of liquid molecules (read on *target molecules*) that are exposed to the light because light energy could be absorbed by those molecules or cause those molecules to be heated and mechanically move around more.

14. With regard to claims 2 and 3, in the developed method of Mitsumori, Mitsumori does not explicitly teach periodically replacing a plurality of surfaces opposite the stream of liquid.

15. In a similar embodiment shown in Figures 19 and 20, Mitsumori teaches moving the treatment liquid stream relative to the treated substrate such that surfaces of the substrate are periodically replaced opposite the liquid stream, and as a result, a large portion of the substrate that includes multiple such surfaces can be treated with the liquid (Par. 0390; Figures 19 and 20).

16. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the developed method of Mitsumori by periodically replacing a plurality of surfaces opposite the liquid stream by relatively moving the liquid stream along a plurality of surfaces of the substrate such that the stream contacts each of those surfaces. The motivation for performing the modification was provided by Mitsumori, who teaches that performing such relative movement of the liquid stream and the

substrate advantageously allows a large portion of the substrate to be treated with the liquid.

17. With regard to claims 6, 11, and 14, Mitsumori teaches replacing one of the light irradiating means (items 380 in Figures 25A and 25B) with an ultrasonic transducer (item 316 in Figure 46) such that the coupled energy comprises light radiation waves and sonic vibration waves (Par. 0552 and 0573-0578; Figure 46). Specifically with regard to claim 6, Mitsumori teaches that the ultrasonic transducer 316 has a frequency within a range of from 0.2 to 5 MHz (0519).

18. With regard to claims 7, 8, 10, and 16, Mitsumori teaches using an excimer laser as the light irradiating means, and with regard to claim 10, since excimer lasers irradiate light at certain ultraviolet wavelengths, excimer laser light in Mitsumori's method is considered to be irradiated at a predetermine wavelength (Par. 0074).

19. With regard to claims 21-23, Mitsumori teaches that the two light irradiation means (items 380 in Figures 25A and 25B) are pulsed light sources that emit light at different wavelengths and are synchronized to emit energy pulses in correlation (Par. 0541).

20. With regard to claims 4, 28, and 29, as discussed above in rejections of claims 6, 11, and 14, Mitsumori teaches replacing one of the two pulsed light irradiating means (items 380 in Figures 25A and 25B) with an ultrasonic transducer (item 316 in Figure 46) such that the coupled energy comprises light radiation waves and sonic vibration waves (Par. 0541, Par. 0552, and 0573-0578; Figure 46). Mitsumori teaches that such ultrasonic energy has the effect of cleaning the treated surface (0027), and although

Mitsumori doesn't explicitly teach that his method of exposing the surface to light and ultrasonic radiation, since the developed method of Mitsumori teaches performing the same method steps with the same materials as those claimed by applicant, the effect of sterilizing the treated surface is expected to occur in the developed method of Mitsumori.

21. Claims 9 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application Publication No. 2001/0037819 by Mitsumori as applied to claim 1 above, and further in view of U.S. Patent Application Publication No. 2005/0081881 by Skeidsvoll et al. (hereafter referred to as “Skeidsvoll”).

22. With regard to claim 9, Mitsumori teaches using an ultraviolet laser as a light source used to perform the treating.

23. Mitsumori does not explicitly teach using a 266 nm or 355 nm laser as a light source.

24. Skeidsvoll teaches a method of treating a surface that involves exposing the treated surface to ultraviolet 355 nm radiation from a pulsed Nd:YAG laser (Par. 0020-0024). Skeidsvoll teaches exposing the surface to such 355 nm radiation advantageously allows undesired deposits to be removed from the treated surface (Par. 0022).

25. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Mitsumori by using a pulsed ultraviolet 355 nm Nd:YAG laser as a light source in his method of treating a surface. The motivation for performing the modification was provided by Mitsumori, who taught using an ultraviolet

laser as a light source for performing the treatment, and by Skeidsvoll, who taught that a pulsed ultraviolet 355 nm Nd:YAG laser can advantageously be used to remove undesired deposits from an exposed surface.

26. With regard to claim 17, the method of Mitsumori in view of Skeidsvoll, as developed in the rejection of claim 9, does not teach the characteristics of the pulsed Nd:YAG laser radiation.

27. Skeidsvoll teaches that when using a pulsed Nd:YAG laser to treat a surface with 355 nm radiation, the pulse amplitude, pulse duration, and pulse frequency are result-effective variables because Skeidsvoll teaches that those variables affect the characteristic way in which the laser energy is irradiated onto the target surface and that some such values are more preferable than others (Par. 0022-0025).

28. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Mitsumori in view of Skeidsvoll by optimizing the pulse amplitude, pulse duration, and pulse frequency of the Nd:YAG laser radiation because, as taught by Skeidsvoll, such variables are result-effective variables.

29. Claims 18 and 19 rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application Publication No. 2001/0037819 by Mitsumori as applied to claim 6 above, and further in view of U.S. Patent Application Publication No. 2004/0182414 by Puskas.

30. With regard to claims 18 and 19, as discussed above in rejections of claims 6, 11, and 14, Mitsumori teaches replacing one of the two pulsed light irradiating means (items 380 in Figures 25A and 25B) with an ultrasonic transducer (item 316 in Figure

46) such that the coupled energy comprises light radiation waves and sonic vibration waves (Par. 0552 and 0573-0578; Figure 46).

31. Mitsumori does not teach that the ultrasonic transducer is used to produce continuous wave energy.

32. Puskas teaches that when using ultrasonic energy to treat a surface, it is advantageous to use high-frequency, continuous wave ultrasonic energy as the ultrasonic energy in order to advantageously prevent damaging the surface (Par. 0028).

33. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Mitsumori, as developed in the rejection of claim 6, by having the ultrasonic transducer emit high-frequency, continuous wave ultrasonic energy as the ultrasonic energy. The motivation for performing the modification was provided by Puskas, who taught that using such energy advantageously prevents damaging the surface. With regard to the language of claim 19, in this developed method of Mitsumori in view of Puskas, pulsed laser radiation and continuous wave ultrasonic energy are combined in the treatment method.

34. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application Publication No. 2001/0037819 by Mitsumori in view of U.S. Patent Application Publication No. 2005/0081881 by Skeidsvoll as applied to claim 9 above, and further in view of U.S. Patent No. 5,669,979 by Elliott et al. (hereafter referred to as "Elliott").

35. With regard to claim 24, the combination of Mitsumori in view of Skeidsvoll teaches that one of the light irradiating means (items 380 in Figures 25A and 25B) is a pulsed 355 nm Nd:YAG laser.

36. The combination of Mitsumori in view of Skeidsvoll does not teach that the other light irradiating means is a pulsed 266 nm laser.

37. Elliott teaches a method of treating a surface that involves exposing the treated surface to ultraviolet 266 nm radiation from a pulsed Nd:YAG laser (Abstract; Col 5, 43-49; Col. 12, 11-22). Elliott teaches exposing the surface to such 266 nm radiation advantageously allows undesired deposits to be removed from the treated surface without damaging the treated surface (Abstract; Col 5, 43-49; Col. 12, 11-22).

38. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the combination of Mitsumori in view of Skeidsvoll by using a pulsed 266 nm radiation Nd:YAG laser as the other light irradiating means. The motivation for performing the modification was provided by Mitsumori, who taught using an ultraviolet laser as a light source for performing the treatment, and by Elliott, who taught that a pulsed ultraviolet 266 nm Nd:YAG laser can advantageously be used to remove undesired deposits from an exposed surface without damaging the treated surface.

39. The combination of Mitsumori in view of Skeidsvoll in view of Elliott, as developed thus far, does not teach that the 355nm pulses occur 150 nanoseconds after the 266 nm pulses. However, Mitsumori teaches pulsing the two irradiation means alternately at certain time intervals (Par. 0541), and the length of such time intervals is considered to be a result-effective variable because it effects how often the treated

surface is exposed to the light pulses that perform the treatment, and therefore, it would have been obvious to one of ordinary skill in the art to optimize the time interval between the 355 nm and 150 nm light pulses because that time interval is considered to be a result-effective variable (MPEP 2144.05, *Optimization of Ranges*).

40. Claims 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application Publication No. 2001/0037819 by Mitsumori as applied to claim 21 above, and further in view of U.S. Patent No. 5,151,134 to Boquillon et al. (hereafter referred to as "Boquillon").

41. With regard to claims 25 and 26, Mitsumori does not teach monitoring the emitted energy between the pulsed laser and the treated surface.

42. Boquillon teaches that when using a pulsed laser to treat a surface, it is advantageous to monitor the repetition frequency of the laser pulses emitted by the laser onto the surface in order to adjust the power irradiated on the targeted surface such that the desired level of power is irradiated onto the targeted surface (Abstract; Col. 1, 5-10; Col. 3, 45-59).

43. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Mitsumori by monitoring the repetition frequency of the laser pulses emitted by a laser. The motivation for performing the modification was provided by Boquillon, who taught that it is advantageous to monitor the repetition frequency of laser pulses emitted by a laser onto a laser-treated surface in order to adjust the power irradiated on the targeted surface such that the desired level of power is irradiated onto the targeted surface.

Conclusion

44. Any inquiry concerning this communication or earlier communications from the examiner should be directed to RYAN COLEMAN whose telephone number is (571)270-7376. The examiner can normally be reached on Monday-Friday, 9-5.

45. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Kornakov can be reached on (571)272-1303. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

46. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/RLC/
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August 28, 2010
/Michael Kornakov/

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